

Disclosure of the invention

5 The invention is further illustrated by four examples which disclose the characteristic features of the invention.

The objects, features and advantages of the invention will become clear from the following description set forth below, in conjunction with the drawings, in which:

FIG. 1 is a block diagram for the writing/reading device.

10 FIG. 2 is a diagrammatic view of the confocal microscope.

Referring to FIG. 1 an optical system for recording and reading data on optical memory 1 is shown. The experimental system includes: a confocal microscope 2, vertical scanning systems 3, 7, a radial scanning system 4, a laser (1) 5, laser (2) 6 and an engine 8 used for rotation of the optical memory 1. The writing process consists in the irradiation of a selected volume of memory 1 with a light beam of the laser (1). The volume selection is carried out with said confocal microscope 2, vertical scanning system 3 and radial scanning system 4. The irradiated volume of fluorescent photosensitive materials suffers a transition (at electronic level for fluorescent photosensitive glasses and at structural level for fluorescent photosensitive
15 vitroceramics) which produces the fluorescence modification. Two procedures could be used for reading. One of this procedures produces the excitation with one-photon process. Laser (2) and vertical scanning system 7 are used in the optical system. The second procedure, which is based on said two-photon process, directs the beam of laser (1) to the specimen.

25 The confocal microscope (FIG. 2) used in writing processes has the following elements: two pinholes 9, 10, the lens 11, 12, 13, 15, the beam-splitter 14, the laser 5 and the detector 16.

30 The present invention will be illustrated in greater details by the following examples, but the merits thereof are not intended to be limited by the materials, compositions and procedures described in these examples.

Example 1: A Ce, Eu doped fluorescent photosensitive glass is used as a support for the optical memory namely:

$\text{Na}_2\text{O-P}_2\text{O}_5\text{-0.005 CeO}_2\text{-0.005 Eu}_2\text{O}_3$.

35 Memory writing is carried out with said laser (1) (XeCl laser) at $\lambda_1 = 308\text{nm}$ and the memory reading is based on said laser (2) Nd:YAG laser with $\lambda_2 = 532\text{ nm}$.

Example 2 : A fluorescent photosensitive glass is the support of optical memory as a variant of Example 1: $2\text{Na}_2\text{O}-(\text{Y}_{0.94}\text{Eu}_{0.01}\text{Pr}_{0.01})_2\text{O}_3-5\text{P}_2\text{O}_5$

The writing process uses a two-photon absorption of laser light. The recording is carried out by a tunable Ti:sapphire laser (1) at $\lambda_1 = 720 \text{ nm}$ with 100fs laser pulses. A Nd:YAG laser (2) at $\lambda_2 = 532 \text{ nm}$ excites the fluorescent material for said reading process.

Example 3 : A Tb doped fluorescent photosensitive vitroc ceramic is used for the optical memory (wt%), namely:

10 $\sim 30\text{SiO}_2-45\text{PbF}_2-14\text{Al}_2\text{O}_3-10\text{YF}_3-1\text{TbF}_3-0.05\text{Sb}_2\text{O}_3-0.01\text{Ag}$

The recording and reading are based on the two-photon processes. A tunable Ti:sapphire laser (1) with 100fs laser pulses writes at $\lambda_1 = 720 \text{ nm}$ and reads at $\lambda_2 = 750 \text{ nm}$.

15 Example 4 : A similar fluorescent photosensitive vitroc ceramic as in Example 3 is used for the optical memory (wt%), namely:

20 $\sim 69\text{SiO}_2-15.3\text{Na}_2\text{O}-5\text{ZnO}-7\text{Al}_2\text{O}_3-0.25\text{Tb}_2\text{O}_3-0.25\text{CeO}_2-0.2\text{Sb}_2\text{O}_3-0.01\text{Ag}-2.3\text{F}-0.7\text{Br}$. The writing is carried out with a tunable Ti: sapphire laser (1) with 100fs laser pulses using $\lambda_1 = 720 \text{ nm}$ while for reading is used $\lambda_2 = 980 \text{ nm}$.

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